im Vertrieb von CAMBOARD Electronics

KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VP-28
Presentation Switcher

P/N: 2900-300080 Rev 5

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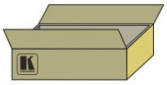
VP-28 Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check the contents of the box



- **VP-28** Presentation Switcher
- IR Remote control transmitter with batteries
- Power cord
- 4 Rubber feet
- 2 "Rack ears"
- Kramer cable ADC-DM/DF+GF
- 1 Quick Start guide

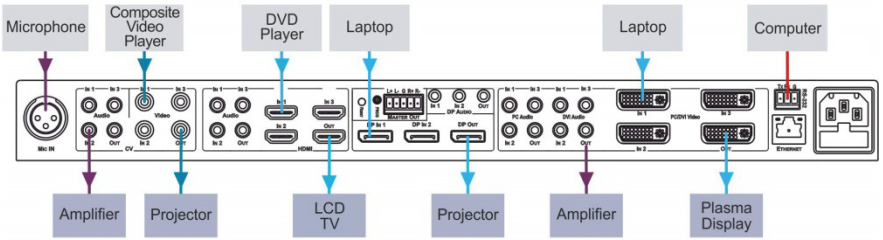
Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

Step 2: Install the VP-28

Mount the device in a rack (using the "rack ears" supplied) or attach the rubber feet and place it on a shelf.

Step 3: Connect the inputs and outputs

Switch off the power to all devices before connecting them to your **VP-28**.



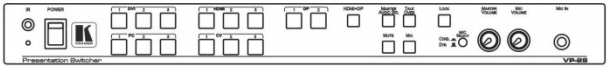
For best results, we recommend that you always use Kramer high-performance cables when connecting AV equipment to the **VP-28**.

Step 4: Connect the power

Using the power cord supplied, connect the **VP-28** to the mains supply.

Step 5: Operate the device

Operate the device using the front panel controls, IR remote control transmitter, RS-232 and Ethernet



Contents

1	**Introduction**	**1**
2	**Getting Started**	**2**
2.1	Achieving the Best Performance	2
2.2	Safety Instructions	3
2.3	Recycling Kramer Products	3
3	**Overview**	**4**
3.1	Defining the VP-28 Presentation Switcher	5
4	**Installing the VP-28 in a Rack**	**8**
5	**Connecting the VP-28**	**9**
5.1	Connecting a Serial Controller to the VP-28	10
5.2	Connecting to the VP-28 via Ethernet	11
5.3	Connecting a Balanced/Unbalanced Stereo Audio Output	13
6	**Operating the VP-28**	**14**
6.1	Operating the Combined 5 x 1 Switching Group	14
6.2	Operating the Combined 14 x 1 Master Audio Switching Group	14
6.3	Locking the Front Panel	15
6.4	Resetting the VP-28 to the Factory Default	16
7	**Operating the VP-28 Remotely**	**17**
7.1	The Controller Software Menu Bar	19
7.2	Connecting to the Device	19
7.3	Switching an Input to the Output of the Group	20
7.4	Selecting a Master Audio Input	20
7.5	Operating the Combined 5 x 1 HDMI/DP Switching Group	21
7.6	Changing the Audio Levels	22
7.7	Muting Audio and Selecting the Talkover or Mix Audio Modes	22
7.8	Changing the Input Button Icons and Labels	23
7.9	Upgrading the Firmware	24
7.10	Setting the IP Network Parameters	24
8	**Technical Specifications**	**26**
9	**Default Parameters**	**28**
9.1	Default Communication Parameters	28
9.2	Default Video/Audio Parameters	28
10	**Protocol 3000 Control Commands**	**29**
11	**Kramer Protocol**	**31**
11.1	Protocol Output Definitions	31
11.2	Kramer Protocol 3000	31

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Figures

Figure 1: VP-28 Presentation Switcher Front Panel 6
Figure 2: VP-28 Presentation Switcher Rear Panel 7
Figure 3: Connecting the VP-28 Presentation Switcher 9
Figure 4: Local Area Connection Properties Window 12
Figure 5: Internet Protocol (TCP/IP) Properties Window 12
Figure 6: Balanced Stereo Audio Output Connection 13
Figure 7: Unbalanced Stereo Audio Output Connection 13
Figure 8: Controller Software Main Window 17
Figure 9: Typical Input Button 18
Figure 10: Connection Method Window 19
Figure 11: Input Selection 20
Figure 12: Master Audio Input Selection 20
Figure 13: Combine Button 21
Figure 14: Combined HDMI and DP Inputs 21
Figure 15: Changing the Audio Levels 22
Figure 16: Muting Audio and Selecting the Talkover and Mix Modes 22
Figure 17: Input Button Properties Window 23
Figure 18: Device Details Window 25

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Video Products.

Congratulations on purchasing your Kramer **VP-28** *Presentation Switcher*, which is ideal for the following typical applications:

- Presentation and conference room systems
- Production studios, as well as rental and staging

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2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

Go to http://www.kramerelectronics.com to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **VP-28** away from moisture, excessive sunlight and dust

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

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2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the power cord that is supplied with the unit

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

3 Overview

The **VP-28** is a high-quality presentation switcher designed for a wide variety of presentation and multimedia applications. The **VP-28** combines the functions of a 3x1 switcher for composite video and audio, a 3x1 switcher for HDMI and audio, a 3x1 switcher for computer graphics video (PC, UXGA) type signals with audio, a 3x1 switcher for DVI and audio, and a 2x1 DisplayPort video and audio switcher. The device includes two microphone inputs mixing facilities. In addition to a 14x1 master audio switcher, the HDMI and DP switching groups can be combined to operate as a 5x1 video and audio switcher.

The **VP-28** is a one-box, high performance solution for installations where you need to control each video/audio group independently and that would otherwise require several separate products.

The **VP-28** features:

- 23 selector switches and front panel control adjustments for master audio output level, and microphone level, mix, talk over and mute functions
- A maximum data rate of 6.75Gbps (2.25Gbps per graphic channel) (HDMI, DVI)
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of either 1.6Gbps or 2.7Gbps (device dependent) per channel (DP)
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems
- Support for HDCP signals
- Support for both digital and analog inputs (hybrid digital/analog presentation switcher)
- Equalization and reclocking of the data
- A 19” 1U enclosure suitable for rack mounting using the supplied “rack ears”
- A lock button to prevent tampering with the front panel

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You can control the **VP-28** via the front panel buttons, IR remote control using the Kramer infrared remote control transmitter (provided), over a LAN via Ethernet, or by RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.

3.1 Defining the VP-28 Presentation Switcher

Figure 1 defines the front panel of the **VP-28**.

Figure 2 defines the rear panel of the **VP-28**.

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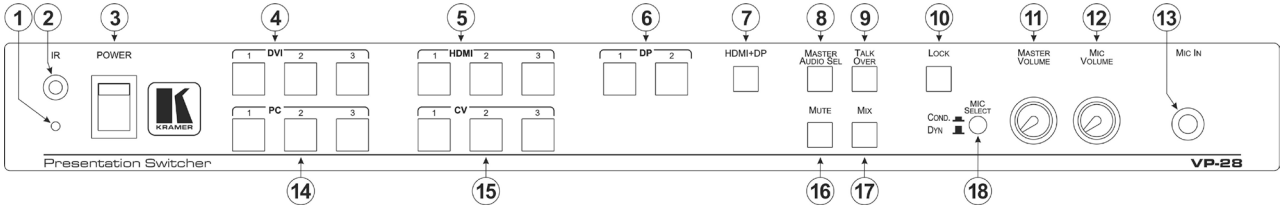


Figure 1: VP-28 Presentation Switcher Front Panel

#	Feature		Function
1	*IR*	LED Indicator	Lights yellow when receiving IR signals
2		Sensor	Receives the IR signal
3	*POWER* Switch		Illuminated switch for turning on the power to the device
4	*DVI* Input Selection Buttons		Press one of the three buttons to select the DVI input
5	*HDMI* Selection Buttons		Press one of the three buttons to select the HDMI input
6	*DP* Selection Buttons		Press one of the two buttons to select the DP input
7	*HDMI+DP* Button		Press to combine/separate the HDMI and DP inputs into a single group (see Section 6.1)
8	*MASTER AUDIO SEL* Button		Press to select the Master audio channel (see Section 6.2)
9	*TALK OVER* Button		Press to select the MIC input as the primary audio feed and to lower the background Master audio level (toggle)
10	*LOCK* Button		Press and hold to lock the front panel buttons. Press and hold again to unlock the buttons
11	*MASTER VOLUME* Knob		Turn to adjust the master audio level
12	*MIC VOLUME* Knob		Turn to adjust the microphone audio level
13	*MIC IN* 6.5mm Microphone Jack		Connect a microphone. **Note**: Only one microphone can be connected at a time
14	*PC* Selection Buttons		Press one of the three buttons to select the PC graphics input
15	*CV* Selection Buttons		Press one of the three buttons to select the CV input
16	*MUTE* Button		Press to mute/unmute the Master audio output
17	*MIX* Button		Press to mix the microphone and Master audio output (toggle)
18	*MIC SELECT* Button	*COND*	Depress the button to select a condenser type microphone
		DYN	Release the button to select a dynamic type microphone

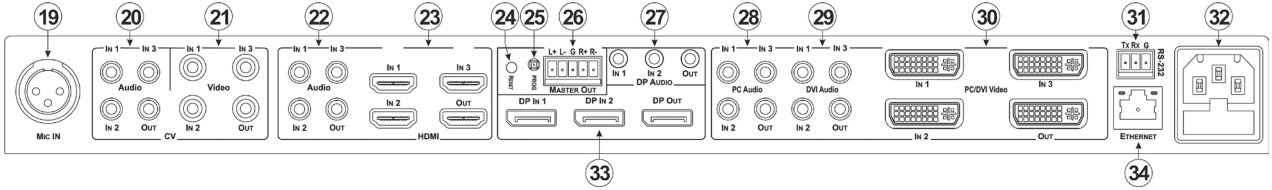


Figure 2: VP-28 Presentation Switcher Rear Panel

#	Feature		Function
19	*MIC IN* XLR Connector		Connect a microphone. **Note**: Only one microphone can be connected at a time
20	*CV AUDIO* 3.5mm Mini Jack Connectors	*IN 1 ~ IN 3, OUT*	Connect to the audio channel of the CV sources and acceptor
21	*CV VIDEO* RCA Connectors	*IN 1 ~ IN 3, OUT*	Connect to the video channel of the CV sources and acceptor
22	*HDMI AUDIO* 3.5mm Mini Jack Connectors	*IN 1 ~ IN 3, OUT*	Connect to the audio channel of the HDMI sources and acceptor
23	*HDMI VIDEO* Connectors	*IN 1 ~ IN 3, OUT*	Connect to the video channel of the HDMI sources and acceptor
24	*RESET* Button		Press and hold while turning on the power to the device to reset to factory default settings (see Section 6.4)
25	*PROG* Button		For the use of Kramer service personnel only
26	*MASTER OUT* 5-pin Terminal Block Balanced Audio Output		Connect to the balanced, stereo master audio acceptor (see Section 5.3)
27	*DP AUDIO* 3.5mm Mini Jack Connectors	*IN 1, IN 2, OUT*	Connect to the audio channel of the DP sources and acceptor
28	*PC AUDIO* 3.5mm Mini Jack Connectors	*IN 1 ~ IN 3, OUT*	Connect to the audio channel of the PC graphics sources and acceptor
29	*DVI AUDIO* 3.5mm Mini Jack Connectors	*IN 1 ~ IN 3, OUT*	Connect to the audio channel of the DVI sources and acceptor
30	*PC/DVI VIDEO* DVI Connectors	*IN 1 ~ IN 3, OUT*	Connect to the PC graphics (using adapters) or DVI video channel of the video sources and acceptor. (We recommend the Kramer ADC-DM/DF+GF (one is supplied with the device) or the C-MDMA/MGMA cable.)
31	*RS-232* Serial Port 3-pin Terminal Block		Connect to a serial controller (see Section 5.1)
32	AC Power Mains Socket and Fuse Holder		Connect to the mains power supply
33	*DP* Connectors	*DP IN 1, DP IN 2, DP OUT*	Connect to the video channel of the DisplayPort sources and acceptor
34	*ETHERNET* LAN RJ-45 Connector		Connect via a LAN to an Ethernet controller (see Section 5.1)

4 Installing the VP-28 in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +40ºC (32º to 104ºF)
STORAGE TEMPERATURE:	-40º to +70ºC (-40º to 158ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

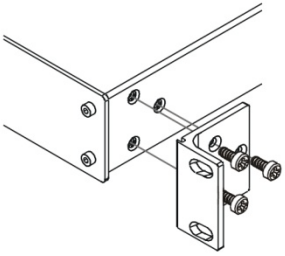
3. The machine is placed straight in the correct horizontal position.

4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

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5 Connecting the VP-28

Always switch off the power to any device before connecting it to your **VP-28**. After connecting your **VP-28**, connect its power and then switch on the power to the other devices.

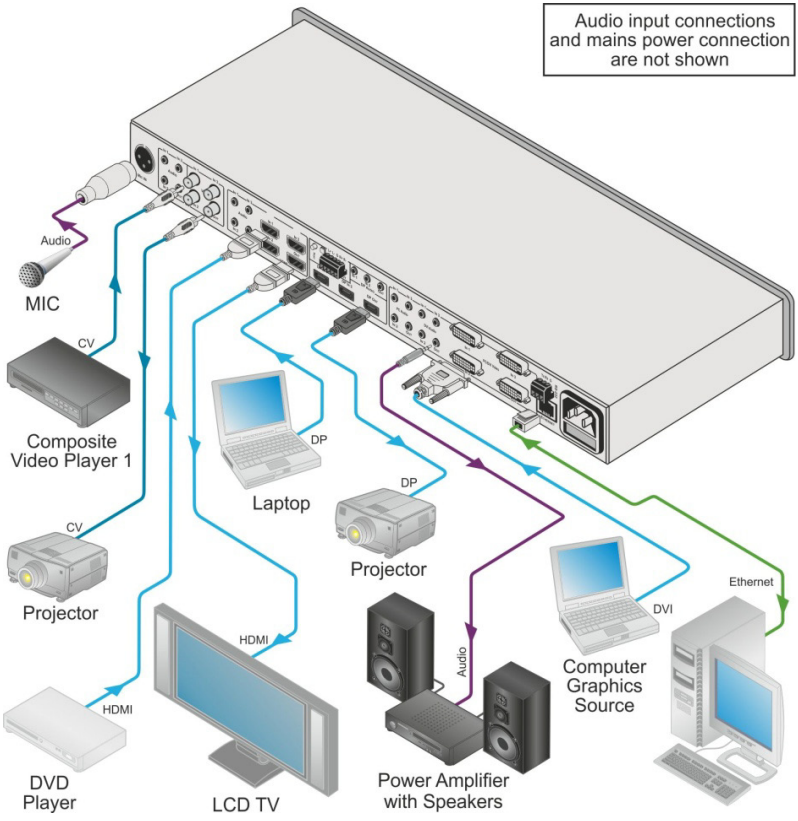

Figure 3: Connecting the VP-28 Presentation Switcher

To connect the VP-28 as illustrated in the example in Figure 3:

1. Connect a microphone to the MIC IN XLR connector.

2. Connect a composite video source (for example, a composite video player) to the VIDEO IN 1 RCA connector.

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3. Connect the composite VIDEO OUT RCA connector to a composite video acceptor (for example, a projector).

4. Connect an HDMI source (for example, a DVD player) to the HDMI IN 1 HDMI connector.

5. Connect the HDMI OUT connector to an HDMI acceptor (for example, an LCD TV).

6. Connect a DisplayPort video source (for example, a laptop) to the DP IN 1 DP connector.

7. Connect the DP OUT connector to a DisplayPort video acceptor (for example, a projector).

8. Connect the DVI AUDIO OUT 3.5mm mini jack connector to an unbalanced, stereo audio acceptor (for example, a power amplifier).

9. Connect a DVI source (for example, a computer) to the DVI IN 1 connector.

   Note: Using the Kramer **ADC-DM/DF+GF** combined cable increases the input options available to you.

10. Optional—Connect a PC via Ethernet over a LAN to the Ethernet RJ-45 connector to control the **VP-28**.

5.1 Connecting a Serial Controller to the VP-28

You can connect to the **VP-28** via an RS-232 connection using, for example, a PC.

To connect to the VP-28 via RS-232:

- Connect the 3-pin terminal block on the rear panel port of the **VP-28** (pin G to pin 5, pin Rx to pin 3, pin Tx to pin 2) to the RS 232 9-pin D-sub port on your PC

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5.2 Connecting to the VP-28 via Ethernet

You can connect the **VP-28** via Ethernet via either of the following methods:

- A crossover cable (see Section 5.2.1) for direct connection to the PC
- A straight through cable (see Section 5.2.2) for connection via a network hub or network router

After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the Ethernet Configuration Guide (Lantronix) in the technical support section on our Web site http://www.kramerelectronics.com.

5.2.1 Connecting the Ethernet Port directly to a PC

You can connect the Ethernet port on the **VP-28** to the Ethernet port on your PC via a crossover cable with RJ-45 connectors. This type of connection is recommended for identification of the factory default IP Address of the **VP-28** during the initial configuration.

To configure your PC after connecting the Ethernet port:

1. Right-click the **My Network Places** icon on your desktop.
2. Select **Properties**.
3. Right-click **Local Area Connection Properties**.
4. Select **Properties**.
   The **Local Area Connection Properties** window appears.
5. Select the **Internet Protocol (TCP/IP)** and click the **Properties** Button.

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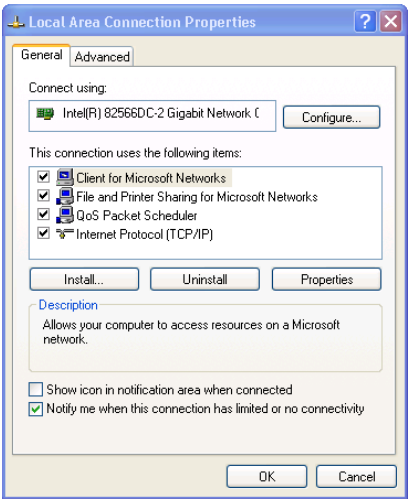

Figure 4: Local Area Connection Properties Window

6. Select **Use the following IP Address** and enter the details as shown in Figure 5. You can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

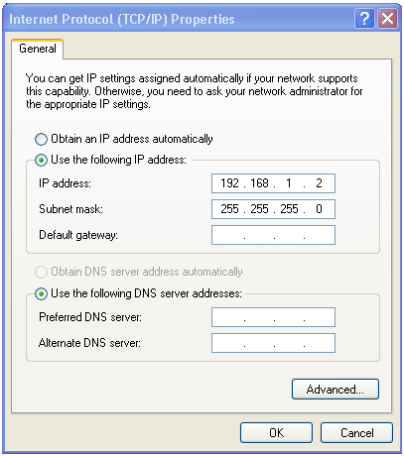
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 1 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 5: Internet Protocol (TCP/IP) Properties Window

7. Click **OK**.

5.2.2 Connecting to the Ethernet Port via a Network Switch/Hub

To connect to the Ethernet port on the VP-28 via a network switch/hub:

- Connect the PC to the Ethernet network switch/hub using a straight through cable

5.3 Connecting a Balanced/Unbalanced Stereo Audio Output

This section illustrates how to wire:

- A balanced stereo audio connection, see Figure 6
- An unbalanced stereo audio output connection, see Figure 7

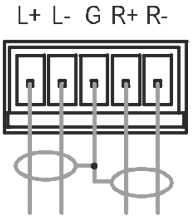

Figure 6: Balanced Stereo Audio Output Connection

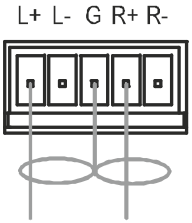

Figure 7: Unbalanced Stereo Audio Output Connection

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6 Operating the VP-28

The input/output button color indicates the current state of the channel as described in the following table.

Button Color	State
Red	Selected group input
Purple	Selected group input + active Master audio input
Green	Selected Master audio input

6.1 Operating the Combined 5 x 1 Switching Group

By default, the **VP-28** operates as a four 3 x 1 and one 2 x 1 switcher whereby the video and audio for each group is switched to the output of the same group. The **VP-28** can also combine the HDMI and DP inputs into a single 5-input group where any one of the five HDMI/DP inputs can be switched to the HDMI output.

To operate the combined 5 x 1 switching group:

1. Press the HDMI+DP button.
   The button lights red.

2. Press one of the three HDMI or two DP input buttons to select an input to switch to the HDMI output.
   The selected input button lights red and the input is switched to the HDMI video and audio outputs.

3. Press the HDMI+DP button to return the switching to separate HDMI and DP groups.
   The button no longer lights and switching is returned to separate groups.

6.2 Operating the Combined 14 x 1 Master Audio Switching Group

The **VP-28** operates in the audio-follow-video mode whereby the audio for each group is switched to the output of the same group. The **VP-28** also operates in a combined 14 x 1 mode whereby any one of 14 audio inputs can be switched to the master balanced audio output.

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To operate the combined 14 x 1 Master audio switching group:

1. Press the Master Audio Sel button.
   The button lights red.

2. Press one of the 14 input select buttons (three DVI, three PC, three HDMI, three CV and two DP) to switch the audio to the Master Out connector.
   The selected button lights green and the input is switched to the Master Audio output.

Note: If this is the same input as is selected for the audio group selection, the button lights purple.

3. Press the Master Audio Sel button to exit the Master audio selection and return to the group selection.
   The button no longer lights but the last Master audio selection remains active.

6.3 Locking the Front Panel

Lock your **VP-28** to prevent changing the settings accidentally or the front panel buttons being tampered with.

To lock the front panel of the VP-28:

- Press and hold the LOCK button.
  The LOCK button lights and the front panel buttons are locked. Pressing any button has no effect but the LOCK button flashes briefly. The **VP-28** can be operated via the remote IR controller, RS-232 or Ethernet

To unlock the front panel of the VP-28:

- Press and hold the LOCK button.
  The front panel buttons are unlocked and the LOCK button no longer lights

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6.4 Resetting the VP-28 to the Factory Default

To reset the VP-28 to factory defaults:

1. Switch off the **VP-28**.
2. Press and hold the RESET button on the rear panel.
3. Switch on the **VP-28**.
4. Wait a few seconds and release the button.
   The parameters and configuration are reset to their factory defaults (see Section 9).

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7 Operating the VP-28 Remotely

You can operate the **VP-28** remotely using the **VP-28** Controller Software via either the RS-232 serial port or the Ethernet port.

The VP-28 Application Software can be downloaded from http://www.kramerelectronics.com.

The Controller Software requires the following:

- Windows™ XP, Vista or Windows™ 7
- Microsoft .Net Framework version 3.5

To install the Controller Software, download the software and run the setup file. After installation, running the Controller Software for the first time displays a window similar to that shown in Figure 8.

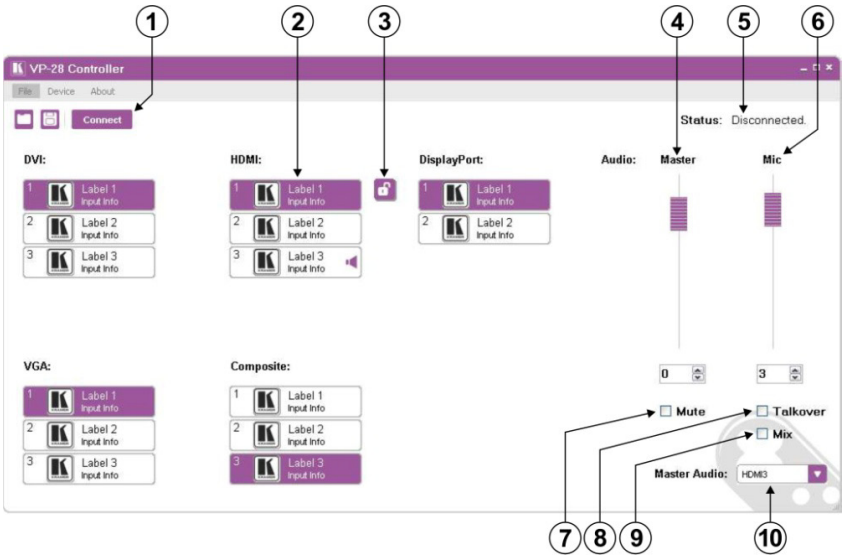

Figure 8: Controller Software Main Window

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#	Feature	Function
1	*Connect/Disconnect* Button	Click to connect to or disconnect from the device (see Section 7.2)
2	Select Input Buttons	Click one of the 14 input buttons to select an input. The selected input button is highlighted
3	Combine Button	Click to combine the three HDMI and two DisplayPort inputs into five inputs
4	*Audio Master* Level Adjustment	Use either the slider or click on the up/down arrows to adjust the master audio level
5	*Status* Indicator	Indicates whether or not the application is connected to the device
6	*Audio Mic* Level Adjustment	Use either the slider or click on the up/down arrows to adjust the microphone audio level
7	*Mute* Check Box	Click to mute/unmute the master audio. Any microphone signal present is not affected
8	*Talkover* Check Box	Press to select the MIC input as the primary audio feed and to lower the background Master audio level (toggle)
9	*Mix* Check Box	Click to select/deselect the talkover audio signal to output
10	*Master Audio* Drop-down List	Click to select one of the audio inputs

Note: When a change is made on the device (for example, a different output is selected), the change is reflected almost immediately in the main window of the controller software, and vice versa.

Figure 9 shows a typical input button.

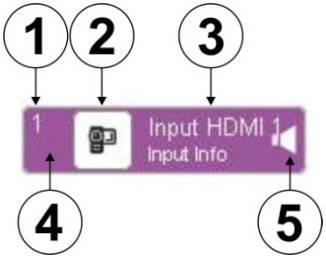

Figure 9: Typical Input Button

#	Feature	Description
1	*1*	Input or output number
2		User-selectable icon selected to be displayed on the button
3	*Input HDMI 1* Label	User-selectable button label
4	Background Color	Indicates the status of the input/output: Purple—active White—inactive
5	Audio Input	The symbol indicates that this is the selected audio input (see Section 7.3)

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7.1 The Controller Software Menu Bar

The following table describes the Controller Software menu bar options.

Menu Bar Options	Sub Menu	Description
File	Open	Open an existing project
	Save	Save the current project
	Exit	Exit the Controller software
Device	Connect/Disconnect	Connect or disconnect to the device
	Firmware Upgrade	Upgrade the device firmware using a new firmware file
	Device Details	Display the device details, such as, model, unit name, IP settings, and so on
ABOUT	NA	Displays the Controller Software and Kramer company details

7.2 Connecting to the Device

To connect to the device:

1. Click the **Connect** button.
   The **Connection Method** window is displayed as shown in Figure 10.

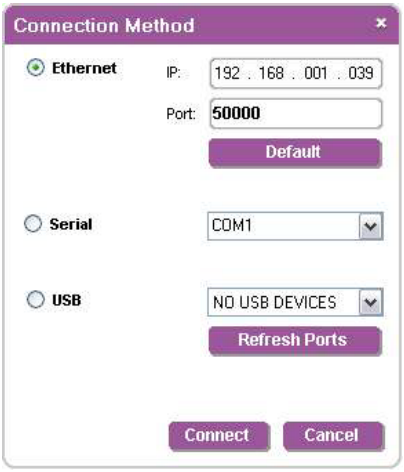

Figure 10: Connection Method Window

2. Select the connection method (via Ethernet over a LAN or serial connection) selecting the relevant option button.

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3. For Ethernet, enter the IP address and Port number of the device and click **Connect**.
   To set the default IP address and Port number, press the **Default** button.

4. For a serial connection, select the required Com port from the drop-down list.

5. Click **Connect**.
   If the connection is successful, the window shown in Figure 8 appears. If the connection is not successful, a Timeout error message appears.

7.3 Switching an Input to the Output of the Group

To switch an input to the output of the group:

- Click on the required input button to activate it.
  The input is selected and the button changes to solid purple as shown in Figure 11.

Figure 11: Input Selection

7.4 Selecting a Master Audio Input

To select a master audio input:

1. Click on the **Master Audio** drop-down list as shown in Figure 12.

Figure 12: Master Audio Input Selection

2. Select the required audio input from the drop-down list.
   The audio input is selected to switch to the master audio output.

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7.5 Operating the Combined 5 x 1 HDMI/DP Switching Group

The HDMI and DP inputs can be grouped together into a single 5 x 1 switching group.

Figure 13: Combine Button

To combine the HDMI and DP inputs into a 5 x 1 switching group:

1. Click on the **Combine** button as shown in Figure 13.
   The following changes occur:
   - The button changes to a locked icon
   - The heading changes to **HDMI & DisplayPort:**
   - An outline appears around both the HDMI and DP input buttons
   - The inputs are combined into a single switching group as shown in Figure 14.

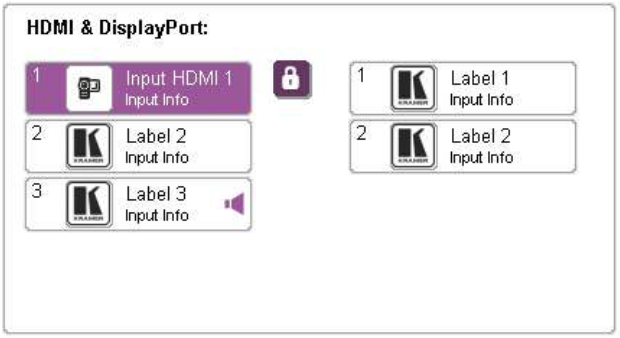

Figure 14: Combined HDMI and DP Inputs

2. To break the combined group into an HDMI and a DP group, press the **Combine** button.
   The button changes to an unlocked icon, the heading changes to **HDMI:** and **DisplayPort:**, the outline disappears and the inputs are no longer grouped.

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7.6 Changing the Audio Levels

To change the audio levels:

- Click, hold and slide on the required slider or click the up and down arrows as shown in Figure 15.
  The volume level changes accordingly.

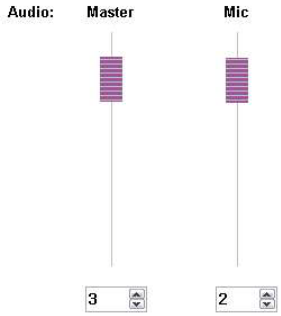

Figure 15: Changing the Audio Levels

7.7 Muting Audio and Selecting the Talkover or Mix Audio Modes

Figure 16: Muting Audio and Selecting the Talkover and Mix Modes

To mute the audio:

- Select the Mute check box.
  The Master audio is muted.

Note: The Mic input is not muted.

To select the Talkover and Mix audio modes:

1. Select the **Talkover** check box.
   The Talkover mode is selected and the presence of a microphone signal will reduce the level of the master audio temporarily.

2. Select the **Mix** check box.

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The Mix mode is selected and the audio from the input and the microphone are mixed together and output.

7.8 Changing the Input Button Icons and Labels

To change an input button icon and label:

1. Right-click on the relevant input button.
   The button properties window appears as shown in Figure 17.

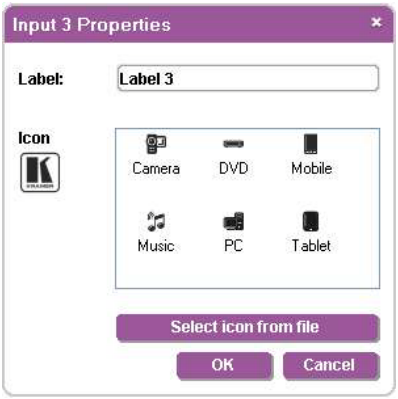

Figure 17: Input Button Properties Window

2. In the **Label** text field, enter the required button label.
3. Either:
   - Select the required icon from the list (you can save custom icons)
     OR
   - Click **Select icon from file** and browse to the icon directory
4. Click **OK**.
   The button characteristics are changed.

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7.9 Upgrading the Firmware

To upgrade the firmware:

1. Download the latest firmware file from http:www.kramerelectronics.com.
2. Click **Device** > **Firmware Upgrade**.
3. Browse to the firmware file that you downloaded.
4. Click **Open**.
   The device firmware is loaded.
   Note: Do not interrupt the uploading process or the device may be damaged.
5. When the process is complete power cycle the device.

7.10 Setting the IP Network Parameters

To set the IP network parameters:

1. Click **Device** > **Device Details**.
2. Under **Connectivity**, edit the required parameter as shown in Figure 18.

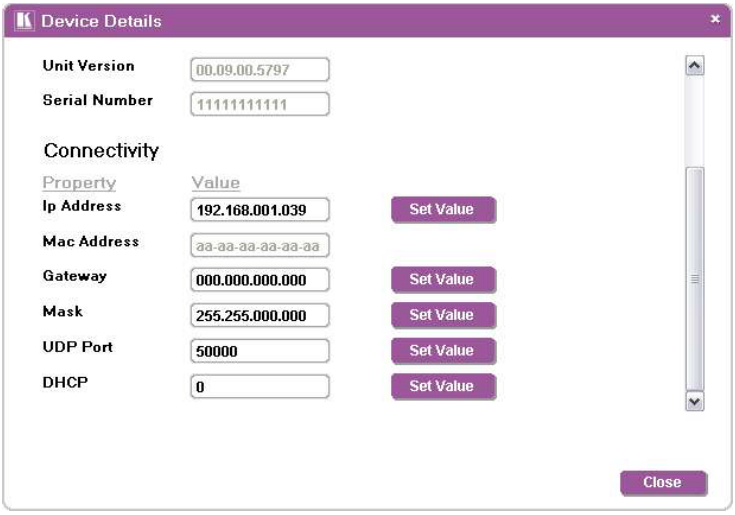

Figure 18: Device Details Window

3. Click **Set Value**.
   A confirmation message appears.

4. Click **OK**.
   The parameter is set.

5. Power cycle the device.

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8 Technical Specifications

INPUTS:	Video: 3 Composite video on RCA connectors 3 HDMI on HDMI connectors 2 DP on DisplayPort connectors 3 PC/DVI on DVI connectors Audio: 1 Microphone on an XLR connector 1 Microphone on a 6.3mm phone jack connector (3mV / 10kΩ condenser/dynamic) 3 Unbalanced stereo audio on 3.5mm mini jack connectors (for CV) 3 Unbalanced stereo audio on 3.5 mini jack connectors (for HDMI) 2 Unbalanced stereo audio on 3.5mm mini jack connectors (for DP) 3 Unbalanced stereo audio on 3.5mm mini jack connectors (for PC audio) 3 Unbalanced stereo audio on 3.5mm mini jack connectors (for DVI)	
OUTPUTS:	Video: 1 Composite video on an RCA connector 1 HDMI on an HDMI connector 1 DP on a DisplayPort connector 1 PC/DVI on a DVI connector Audio: 1 Unbalanced stereo audio on a 3.5mm mini jack connector (for CV) 1 Unbalanced stereo audio on a 3.5 mini jack connector (for HDMI) 1 Unbalanced stereo audio on a 3.5mm mini jack connector (for DP) 1 Unbalanced stereo audio on a 3.5mm mini jack connector (for PC audio) 1 Unbalanced stereo audio on a 3.5mm mini jack connector (for DVI) 1 Master balanced stereo audio on a 5-pin terminal block	
	VIDEO	AUDIO
MAX. OUTPUT LEVEL:	CV: 1.7Vpp XGA: 2.3Vpp	Master: 17Vpp from Mic, 12.4Vpp from Line in Local Out: 8.8Vpp from line inputs
BANDWIDTH (-3dB):	CV: 680MHz XGA: 290MHz (–4dB 400MHz)	>25kHz
DIFF. GAIN:	CV: 2.5% XGA: 0.1%	
DIFF. PHASE:	CV: 0.4 Deg. XGA: 0.1 Deg.	
K-FACTOR:	CV: <0.05% XGA: <0.05%	
S/N RATIO:	CV: 74dB XGA: 71dB @5MHz	Master: 81dB from Mic (@20mVpp input, 17Vpp output diff, “A” weighting, XLR microphone) 90 to 95dB from Line in (“A” weighting) Local Outputs: 110dB (“A” weighting)
CROSSTALK @1kHz (all hostile):	CV: –54dB XGA: –56dB (5MHz)	Master: –70dB Local Outputs: –80dB from Line in
CONTROLS (Level Range):	MASTER: <–12 to 70dB from Mic, –79 to +15dB from Line in	
COUPLING:	CV: DC XGA: DC	AC

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AUDIO THD + NOISE:		Master: 0.4% from Mic, 0.02% from Line in ("A" weighting) Local out: 0.04% from Line in
AUDIO 2nd HARMONIC:		Master: 0.0.3% from Mic, 0.01% from Line in Local out: 0.02% from Local output
COMPLIANCE WITH HDCP STANDARD:	Supports HDCP	
MAXIMUM BANDWIDTH DP TO HDMI:	One or two lane (1.65Gbps per lane)	
INDICATOR LEDs:	IR	
POWER SOURCE:	90–264V AC, 23VA	
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)	
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)	
HUMIDITY:	10% to 90%, RHL non-condensing	
DIMENSIONS:	19" x 7.35" x 1U (W, D, H) rack mountable	
WEIGHT:	1.8kg (3.97lbs) approx.	
ACCESSORIES:	Power cord, rack "ears", Kramer infrared remote control transmitter, Kramer ADC-DM/DF+GF DVI to DVI and VGA breakout cable	
OPTIONS:	Kramer C-MDMA/MGMA DVI/VGA/audio breakout cable	
Specifications are subject to change without notice at http://www.kramerelectronics.com		

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9 Default Parameters

9.1 Default Communication Parameters

EDID	
EDID data is passed between the connected output and the live input within each of the DVI/ VGA, HDMI or DP groups	
RS-232	
Protocol 3000 (Default)	
Baud Rate	115,200
Data Bits	8
Stop Bits	1
Parity	None
Command Format	ASCII
Example (Output 1 to Input 1)	#AV 1>1<CR>
Ethernet	
To reset the IP settings to the factory reset values, power cycle the device while holding in the Factory Reset button, located on the rear panel of the unit	
IP Address	192.168.1.39
Subnet mask	255.255.255.0
Default gateway	192.168.1.1
TCP Port #	5000
UDP Port #	50000
Maximum UDP Ports	10
Maximum TCP Ports	4

9.2 Default Video/Audio Parameters

Item	Description
Switched input in all groups	1
Master audio gain	0dB
Mic audio gain	0dB

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10 Protocol 3000 Control Commands

The following sections describe the ASCII values (which the protocol in Section 11 describes in more detail).

10.1.1 The Switching Control ASCII Table

The following table lists the Protocol 3000 ASCII audio and video switching for the **VP-28**.

Inputs			Command
Group	#		
DVI	In 1		#AV 1>1<CR>
	In 2		#AV 2>1<CR>
	In 3		#AV 3>1<CR>
VGA	In 1		#AV 1>2<CR>
	In 2		#AV 2>2<CR>
	In 3		#AV 3>2<CR>
HDMI	In 1		#AV 1>3<CR>
	In 2		#AV 2>3<CR>
	In 3		#AV 3>3<CR>
	In 4		#AV 4>3<CR>
	In 5		#AV 5>3<CR>
CV	In 1		#AV 1>4<CR>
	In 2		#AV 2>4<CR>
	In 3		#AV 3>4<CR>
DP	In 1		#AV 1>5<CR>
	In 2		#AV 2>5<CR>
Master Audio	In 1	DVI 1	#AUD 1>6<CR>
	In 2	DVI 2	#AUD 2>6<CR>
	In 3	DVI 3	#AUD 3>6<CR>
	In 4	VGA 1	#AUD 4>6<CR>
	In 5	VGA 2	#AUD 5>6<CR>
	In 6	VGA 3	#AUD 6>6<CR>
	In 7	HDMI 1	#AUD 7>6<CR>
	In 8	HDMI 2	#AUD 8>6<CR>
	In 9	HDMI 3	#AUD 9>6<CR>
	In 10	CV 1	#AUD 10>6<CR>
	In 11	CV 2	#AUD 11>6<CR>
	In 12	CV 3	#AUD 12>6<CR>
	In 13	DP 1	#AUD 13>6<CR>
	In 14	DP 2	#AUD 14>6<CR>

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10.1.2 Audio Gain Control ASCII Tables

The following table sets the audio gain control for the groups.

Master Output	MIC Output	Gain
# AUD-LVL 2,6,–80<CR>	# AUD-LVL 2,7,–80<CR>	–80dB (mute)
⋮	⋮	⋮
# AUD-LVL 2,6,–50<CR>	# AUD-LVL 2,7,–50<CR>	–50dB (mute)
⋮	⋮	⋮
# AUD-LVL 2,6,0<CR>	# AUD-LVL 2,7,0<CR>	0dB (1:1)
⋮	⋮	⋮
# AUD-LVL 2,6,15<CR>	# AUD-LVL 2,7,15<CR>	15dB (max)

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11 Kramer Protocol

The **VP-28** supports Kramer Protocol 3000.

11.1 Protocol Output Definitions

The protocol output definitions are:

- DVI video group defined as output 1
- VGA video group defined as output 2
- HDMI video group defined as output 3
- CV video group defined as output 4
- DP video group defined as output 5
- Master audio selector defined as output 6
- MIC audio defined as output 7

11.2 Kramer Protocol 3000

The Protocol 3000 RS-232 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal Application).

11.2.1 Protocol 3000 Syntax

Host message format:

Start	Address (optional)	Body	Delimiter
#	*Destination_id*@	message	CR

Simple command (commands string with only one command without addressing):

start	body	delimiter
#	Command SP Parameter_1,Parameter_2,…	CR

Commands string (formal syntax with commands concatenation and addressing):

*Address*@ **Command_1** *Parameter1_1*,*Parameter1_2*,… **|***Command_2 Parameter2_1*,*Parameter2_2*,… **|***Command_3 Parameter3_1*,*Parameter3_2*,… |…**CR**

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Device message format:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	message	CR LF

Device long response (Echoing command):

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**command** SP [*param1 ,param2 …*] result	CR LF

CR = Carriage return (ASCII 13 = 0x0D)

LF = Line feed (ASCII 10 = 0x0A)

SP = Space (ASCII 32 = 0x20)

11.2.2 Command Part Details

Command:
Sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command will separate from parameters with at least single space.

Parameters:
Sequence of Alfa-Numeric ASCII chars ('0'-'9','A'-'Z','a'-'z' and some special chars for specific commands), parameters will be separated by commas.
Message string:
Every command must to be entered as part of message string that begin with **message starting char** and end with **message closing char**, note that string can contain more then one command separated by pipe ("|") char.

Message starting char:
'#' for host command\query.
'~' for machine response.

Device address (Optional, for KNET):
KNET Device ID follow by '@' char.
Query sign = '?', will follow after some commands to define query request.
Message closing char =
Host messages - Carriage Return (ASCII 13), will be referred to by **CR** in this document.
Machine messages **-** Carriage Return (ASCII 13) + Line-Feed (ASCII 10), will be referred to by **CRLF**.
Spaces between parameters or command parts will be ignored.

Commands chain separator char:
When **message string** contains more than one command, commands will be separated by pipe ("|").

Commands entering:
If terminal software used to connect over serial \ ethernet \ USB port, that possible to directly enter all commands characters (CR will be entered by Enter key, that key send also LF, but this char will be ignored by commands parser).
Sending commands from some controllers (like Crestron) require coding some characters in special form (like \X##). Anyway, there is a way to enter all ASCII characters, so it is possible to send all commands also from controller.
(Similar way can use for URL \ Telnet support that maybe will be added in future).

Commands forms:
Some commands have short name syntax beside the full name to allow faster typing, response is always in long syntax.

Commands chaining:
It is possible to enter multiple commands in same string by '|' char (pipe).
In this case the **message starting char** and the **message closing char** will be entered just one time, in the string beginning and at the end.
All the commands in string will not execute until the closing char will be entered.
Separate response will be sent for every command in the chain.

Input string max length:
64 characters.

The following table lists the instruction codes for Protocol 3000.

Help commands		
Command	**Syntax**	**Response**
Protocol Handshaking	**#CR**	~OK**CRLF**

Device initiated messages	
Command	**Syntax**
Start message	Kramer Electronics LTD. , **Device Model** Version **Software Version**
Switcher actions	
Audio-video channel has switched (AFV mode)	**AV** *IN>OUT*
Video channel has switched (Breakaway mode)	**VID** *IN>OUT*
Audio channel has switched (Breakaway mode)	**AUD** *IN>OUT*

Result codes (errors)	
	Syntax
No error. Command running succeeded	COMMAND PARAMETERS **OK**
Protocol Errors	
Syntax Error	**ERR001**
Command not available for this device	**ERR002**
Parameter is out of range	**ERR003**
Unauthorized access (running command without the match login).	**ERR004**

Basic routing commands		
Command	**Syntax**	**Response**
Switch audio & video	**AV** *IN*>*OUT*, *IN*>*OUT*, …	**AV** *IN*>*OUT*, *IN*>*OUT*,…*RESULT*
Switch video only	**VID** *IN*>*OUT*, *IN*>*OUT*, … **Short form**: **V** *IN*>*OUT*, *IN*>*OUT*, …	**VID** *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		
Switch audio only	**AUD** *IN*>*OUT*, *IN*>*OUT*, … **Short form**: **A** *IN*>*OUT*, *IN*>*OUT*, …	**AUD** *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also video.		
Read video connection	**VID?** *OUT* **Short form**: **V?** *OUT* **VID?** *	**VID** *IN>OUT* **VID** *IN*>**1**, *IN*>**2**, …

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Read audio connection	**AUD?** *OUT* **Short form**: **A?** *OUT* **AUD? ***	**AUD** *IN*>*OUT* **AUD** *IN*>**1**, *IN*>**2**, …

Parameters Description:
IN = Input number or '0' to disconnect output.
'>' = Connection character between in and out parameters.
OUT = Output number or '*' for all outputs.

Examples:		
Switch Video and Audio input 3 to output 7	#AV 3>7**CR**	~AV 3>7 OK**CRLF**
Switch Video input 2 to output 4	#V 2>4**CR**	~VID 2>4 OK**CRLF**
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2**CR**	~6@VID 4>2 OK**CRLF**
Disconnect Video and Audio Output 4	#AV 0>4**CR**	~AV 0>4 OK**CRLF**
Switch Video Input 3 to All Outputs	#V 3>***CR**	~VID 3>* OK**CRLF**

Chaining Multiple commands*	#AV 1>* | V 3>4, 2>2, 82>1, 0>2 |V 82>3| A 0>1 | V? * **CR** First switch all Audio and video outputs from input 1, **Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2.** Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering **CR**, response will sent for each command after processing it.	~AV 1>* OK**CRLF** ~VID 1>2, 3>4 OK**CRLF** ~VID 82>3 **ERR###** **CRLF** ~AUD 0>1 OK**CRLF** ~V 1>1, 0>2, 1>3, 3>4 **CRLF**

Operation commands		
Command	**Syntax**	**Response**
Lock front panel	**LOCK-FP** *LOCK-MODE* **Short form: LCK** *LOCK-MODE*	**LOCK-FP** *LOCK-MODE* *RESULT*
Get front panel locking state	**LOCK-FP?**	**LOCK-FP** *LOCK-MODE*
Parameters Description: **LOCK-MODE** = Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		
Restart device	**RESET**	**RESET OK**

Audio parameters commands		
Command	**Syntax**	**Response**
Set audio level in specific amplifier stage.	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* **Short form: ADL** *STAGE*, *CHANNEL*, *VOLUME*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* *RESULT*
Read audio volume level	**AUD-LVL?** *STAGE*, *CHANNEL* **Short form: ADL?** *STAGE*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME*
Mute audio	**MUTE** *MUTE-MODE*	**MUTE** *MUTE-MODE*

		RESULT
Read audio mute state	**MUTE?**	**MUTE** *MUTE-MODE*
Set talk over	**TLK** *TALKOVER_MODE*	**TLK** *TALKOVER_MODE* *RESULT*
Read talk over	**TLK?**	**TLK** *TALKOVER_MODE*
Set audio mix	**MIX** *MIX-MODE*	**MIX** *MIX-MODE RESULT*
Read audio mix	**MIX**?	**MIX** *MIX-MODE*

Parameters Description:

STAGE =
"In","Out"
or
Numeric value (present audio processing stage). For example: "0" for Input level, "1" for Pre-Amplifier, "2" for Amplifier (Out) etc.
CHANNEL = Input or Output #

VOLUME = Audio parameter in Kramer units, precede minus sign for negative values.
++ increase current value,
-- decrease current value.

Machine info commands		
Command	**Syntax**	**Response**
* Time settings commands require admin authorization		
Read in\outs count	**INFO-IO?**	**INFO-IO: IN** *INPUTS_COUNT*, **OUT** *OUTPUTS_COUNT*
Read max presets count	**INFO-PRST?**	**INFO-PRST: VID** *PRESET_VIDEO_COUNT*, **AUD** *PRESET_AUDIO_COUNT*
Reset configuration to factory default	**FACTORY**	**FACTORY** *RESULT*

Identification commands		
Command	**Syntax**	**Response**
Protocol Handshaking	**#CR**	**~OK CRLF**
Read device model	**MODEL?**	**MODEL** *MACHINE_MODEL*
Read device serial number	**SN?**	**SN** *SERIAL_NUMBER*
Read device firmware version	**VERSION?**	**VERSION** *MAJOR* .*MINOR* .*BUILD* .*REVISION*
Set machine name	**NAME** *MACHINE_NAME*	**NAME** *MACHINE_NAME* *RESULT*
Read machine name	**NAME?**	**NAME** *MACHINE_NAME*
Reset machine name to factory default*	**NAME-RST**	**NAME-RST** *MACHINE_FACTORY_NAME* *RESULT*
*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on). *MACHINE_NAME* = Up to 14 Alfa-Numeric chars. * **Machine factory name =** Model name + last 4 digits from serial number.		

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Identification commands		
Command	**Syntax**	**Response**
Ethernet Commands		
Set IP address	**NET-IP** *IP_ADDRESS* Short form: **NTIP**	**NET-IP** *IP_ADDRESS* *RESULT*
Read IP address	**NET-IP?** Short form: **NTIP?**	**NET-IP** *IP_ADDRESS*
Read MAC address	**NET-MAC?** Short form: **NTMC**	**NET-MAC** *MAC_ADDRESS*
Set subnet mask	**NET-MASK** *SUBNET_MASK* Short form: **NTMSK**	**NET-MASK** *SUBNET_MASK* *RESULT*
Read subnet mask	**NET-MASK?** Short form: **NTMSK?**	**NET-MASK** *SUBNET_MASK*
Set gateway address	**NET-GATE** *GATEWAY_ADDRESS* Short form: **NTGT**	**NET-GATE** *GATEWAY_ADDRESS* RESULT
Read subnet mask	**NET-GATE?** Short form: **NTGT?**	**NET-GATE** *GATEWAY_ADDRESS*
Set DHCP mode	**NET-DHCP** *DHCP_MODE* Short form: **NTDH**	**NET-DHCP** *DHCP_MODE* *RESULT*
Read subnet mask	**NET-DHCP?** Short form: **NTDH?**	**NET-DHCP** *DHCP_MODE*
DHCP_MODE = '0' – Don't use DHCP (Use IP set by factory or IP set command). '1' – Try to use DHCP, if unavailable use IP as above.		
Change protocol Ethernet port	**ETH-PORT** *PROTOCOL* , *PORT* Short form**: ETHP**	**ETH-PORT** *PROTOCOL* , *PORT* *RESULT*
Read protocol Ethernet port	**ETH-PORT?** *PROTOCOL* Short form: **ETHP?**	**ETH-PORT** *PROTOCOL* , *PORT*
PROTOCOL = TCP/UDP (transport layer protocol) PORT = Ethernet port that accepts Protocol 3000 commands 1-65535 = User defined port 0 - Reset port to factory default (50000 for UDP, 5000 for TCP)		
Factory Commands		
Reset to factory default configuration	**FACTORY**	**FACTORY** *RESULT*

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

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